

# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

REC'D U 7 NOV 2005

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Applicant's or agent's file reference P.7194.WOP	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/GB2004/003038	International filing date (day/month/year) 13.07.2004	Priority date (day/month/year) 24.07.2003
International Patent Classification (IPC) or both national classification and IPC H04R7/04		
Applicant NEW TRANSDUCERS LIMITED et al		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 4 sheets, including this cover sheet.
  - ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 2 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the opinion
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand  15.03.2005	Date of completion of this report  07.11.2005
Name and mailing address of the international preliminary examining authority:   European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer  Timms, O  Telephone No. +31 70 340-2067 

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. **PCT/GB2004/003038**

**I. Basis of the report**

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17):*

**Description, Pages**

1-15 as originally filed

**Claims, Numbers**

1-13 filed with telefax on 15.03.2005

**Drawings, Sheets**

1/4-4/4 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).  
☐ the language of publication of the international application (under Rule 48.3(b)).  
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.  
☐ filed together with the international application in computer readable form.  
☐ furnished subsequently to this Authority in written form.  
☐ furnished subsequently to this Authority in computer readable form.  
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.  
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:  
☐ the claims, Nos.:  
☐ the drawings, sheets:

**INTERNATIONAL PRELIMINARY  
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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Yes: Claims	1-13
	No: Claims	
Inventive step (IS)	Yes: Claims	
	No: Claims	1-13
Industrial applicability (IA)	Yes: Claims	1-13
	No: Claims	

2. Citations and explanations

**see separate sheet**

**Re Item V**

**Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of **independent claim 1** is not inventive in the sense of Article 33(3) PCT.

**Independent claim 1:** regarding the teaching of the document D1 it is considered that the placing of vibration exciting means along the main or major axis of a bending wave panel has the same technical effect on the producing of an acoustical signal along modal and non-modal axis as the placing of vibration exciting means along the cross or minor axis. The reasons for that are:

- the devices described in the document D1 and in the present application are both designed to excite the panel into resonance along the modal axis and to restrain resonances along non-modal axis;
- an acoustic output of both devices is of wide directivity along the modal axis and of narrow directivity along the non-modal axis.

**Dependent claims 2-13** do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of inventive step, see documents D1, D2 and D3 and the corresponding passages cited in the search report.

CLAIMS

1. A bending wave loudspeaker having an operating frequency range and a coincidence frequency which is above the operating frequency range, comprising a resonant panel  
5 having a main or major axis and a cross or minor axis and an aspect ratio of at least 2:1, vibration exciting means coupled to the panel to excite the panel into resonance along the cross or minor axis of the panel, and means restraining or preventing resonance along the main or major  
10 axis of the panel whereby the panel radiates an acoustic output which is of wide directivity along the cross or minor axis and of narrow directivity along the main or major axis of the panel.
2. A loudspeaker according to claim 1, wherein the panel  
15 is rectangular.
3. A loudspeaker according to claim 1 or claim 2, wherein the vibration exciting means forms the means restraining or preventing resonance along the main or major axis.
4. A loudspeaker according to claim 3, wherein the  
20 coupling of the vibration exciting means to the panel is longer than the wavelength of sound in air at the lowest required frequency.
5. A loudspeaker according to any preceding claim, wherein the vibration exciting means comprises a line of  
25 discrete exciters extending along the main or major axis and operated substantially in phase.
6. A loudspeaker according to claim 5, wherein the spacing between the exciters is not substantially greater

than half the wavelength in the panel at the highest operating frequency.

7. A loudspeaker according to claim 5 or claim 6, wherein the line is rectilinear.

5 8. A loudspeaker according to any one of claims 5 to 7, wherein the line extends substantially from one end of the panel to the other end.

9. A loudspeaker according to any one of claims 5 to 8, wherein there are at least four exciters in the line.

10 10. A loudspeaker according to any one of claims 5 to 9, wherein the line of exciters is to one side of the median longitudinal axis of the panel.

11. A loudspeaker according to claim 10, wherein the line is on the nodal line of the first lateral bending mode.

15 12. A loudspeaker according to any one of claims 5 to 11, wherein the exciters are equally spaced along the line.

13. A loudspeaker according to any one of claims 5 to 12, wherein the exciter spacing  $d$  in the line and the bending stiffness  $B$  and areal density  $\mu$  of the panel substantially

20 conform to the formula:-

$$\frac{B}{\mu} = \left( \frac{cd}{\pi} \right)^2$$